

U.S. Patent Application Serial No. 10/527,090  
Response filed July 30, 2007  
Reply to OA dated March 5, 2007

**AMENDMENTS TO THE CLAIMS:**

Please cancel claims 3, 9, 15, 16 and 21 without prejudice or disclaimer, and amend claims 1, 7, 11, 13, 19, 23, 25, 26, 28, 29, 31, 32, 34 and 35, as follows. This listing of claims will replace all prior versions, and listings, of claims in the application:

**Listing of Claims:**

Claim 1 (Currently amended): A transformant of *Streptomyces mobaraensis*, comprising a ~~structural~~ gene ~~[[of]]~~ encoding transglutaminase isolated from *Streptomyces mobaraensis* and a promoter promoting transcription of the gene and a terminator ~~acting on~~ serving to terminate transcription of the ~~structural gene, which are externally introduced,~~

wherein the ~~structural~~ gene comprises the sequence set forth in SEQ ID NO: 1;

wherein the terminator is a terminator of transglutaminase isolated from *Streptomyces mobaraensis*.

Claim 2 (Previously Presented): The transformant of *Streptomyces mobaraensis* according to claim 1, wherein the promoter is a promoter of transglutaminase isolated from *Streptomyces mobaraensis*.

Claims 3-4 (Canceled).

U.S. Patent Application Serial No. 10/527,090  
Response filed July 30, 2007  
Reply to OA dated March 5, 2007

Claim 5 (Previously Presented): A transformant of *Streptomyces mobaraensis* comprising a DNA fragment having an externally introduced sequence set forth in SEQ ID NO: 2.

Claim 6 (Previously Presented): The transformant of *Streptomyces mobaraensis* according to claim 1, which is a transformant of *Streptomyces mobaraensis* S-8112.

Claim 7 (Currently amended): A process for producing transglutaminase, comprising the steps of:

culturing a transformant of *Streptomyces mobaraensis* comprising a ~~structural~~ gene ~~[[of]]~~ encoding transglutaminase isolated from *Streptomyces mobaraensis* and a promoter promoting on the transcription of the gene and a terminator ~~acting on the structural~~ serving to terminate transcription of the gene, ~~which are externally introduced~~, under the conditions where the ~~structural~~ gene can be expressed; and

collecting the produced transglutaminase,

wherein the ~~structural~~ gene comprises the sequence set forth in SEQ ID NO: 1;

wherein the terminator is a terminator of transglutaminase isolated from *Streptomyces mobaraensis*.

U.S. Patent Application Serial No. 10/527,090

Response filed July 30, 2007

Reply to OA dated March 5, 2007

Claim 8 (Previously Presented): The process for producing transglutaminase according to claim 7, wherein the promoter is a promoter of transglutaminase isolated from *Streptomyces mobaraensis*.

Claims 9-10 (Canceled).

Claim 11 (Currently Amended): The process for producing transglutaminase, comprising the steps of:

culturing a transformant of *Streptomyces mobaraensis* comprising a ~~structural~~ gene ~~[[of]]~~ encoding transglutaminase isolated from *Streptomyces mobaraensis* and a promoter promoting on the transcription of the gene and a terminator ~~acting on the structural~~ serving to terminate transcription of the gene, ~~which are externally introduced~~, under the conditions where the ~~structural~~ gene can be expressed; and

collecting the produced transglutaminase,

wherein the transformant of *Streptomyces mobaraensis* comprises a DNA fragment having an externally introduced sequence set forth in SEQ ID NO: 2;

wherein the terminator is a terminator of transglutaminase isolated from *Streptomyces mobaraensis*.

U.S. Patent Application Serial No. 10/527,090  
Response filed July 30, 2007  
Reply to OA dated March 5, 2007

Claim 12 (Previously Presented): The process for producing transglutaminase according to claim 7, wherein the transformant of *Streptomyces mobaraensis* is a transformant of *Streptomyces mobaraensis* S-8112.

Claim 13 (Currently amended): A transformant of *Streptomyces lividans* comprising a ~~structural~~ gene ~~[[of]]~~ encoding transglutaminase isolated from *Streptomyces mobaraensis*, and a promoter promoting on the transcription of the gene and a terminator ~~acting on the structural~~ serving to terminate transcription of the gene, which are externally introduced; wherein the ~~structural~~ gene comprises the sequence set forth in SEQ ID NO: 1;

wherein the terminator is a terminator of transglutaminase isolated from *Streptomyces mobaraensis*.

Claim 14 (Previously Presented): The transformant of *Streptomyces lividans* according to claim 13, wherein the promoter is a promoter of transglutaminase isolated from *Streptomyces mobaraensis*.

Claims 15-16 (Canceled).

Claim 17 (Previously Presented): A transformant of *Streptomyces lividans* comprising a DNA fragment having an externally introduced sequence set forth in SEQ ID NO: 2.

U.S. Patent Application Serial No. 10/527,090  
Response filed July 30, 2007  
Reply to OA dated March 5, 2007

Claim 18 (Previously Presented): The transformant of *Streptomyces lividans* according to claim 13, which is a transformant of *Streptomyces lividans* 3131.

Claim 19 (Currently Amended): A process for producing transglutaminase, comprising the steps of:

culturing a transformant of *Streptomyces lividans* comprising a ~~structural~~ gene ~~[[of]]~~ encoding transglutaminase isolated from *Streptomyces mobaraensis*, and a promoter promoting on the transcription of the gene and a terminator ~~acting on the structural~~ serving to terminate transcription of the gene, ~~which are externally introduced~~, under the conditions where the ~~structural~~ gene can be expressed; and

collecting the produced transglutaminase, wherein the ~~structural~~ gene comprises the sequence set forth in SEQ ID NO: 1;

wherein the terminator is a terminator of transglutaminase isolated from *Streptomyces mobaraensis*.

Claim 20 (Previously Presented): The process for producing transglutaminase according to claim 19, wherein the promoter is a promoter of transglutaminase isolated from *Streptomyces mobaraensis*.

Claims 21-22 (Canceled).

U.S. Patent Application Serial No. 10/527,090

Response filed July 30, 2007

Reply to OA dated March 5, 2007

Claim 23 (Currently Amended): The process for producing transglutaminase comprising the steps of:

culturing a transformant of *Streptomyces lividans* comprising a ~~structural~~ gene ~~[[of]]~~ encoding transglutaminase isolated from *Streptomyces mobaraensis*, and a promoter promoting on the transcription of the gene and a terminator ~~acting on the structural~~ serving to terminate transcription of the gene, ~~which are externally introduced~~; under the conditions where the ~~structural~~ gene can be expressed; and

collecting the produced transglutaminase,

wherein the transformant of *Streptomyces lividans* comprises a DNA fragment having an externally introduced sequence set forth in SEQ ID NO: 2;

wherein the terminator is a terminator of transglutaminase isolated from *Streptomyces mobaraensis*.

Claim 24 (Previously Presented): The process for producing transglutaminase according to claim 19, wherein the transformant of *Streptomyces lividans* is a transformant of *Streptomyces lividans* 3131.

Claim 25 (Previously Presented): A transformant of *Streptomyces mobaraensis* comprising a ~~structural~~ gene ~~[[of]]~~ encoding transglutaminase and a promoter promoting on the transcription of

U.S. Patent Application Serial No. 10/527,090

Response filed July 30, 2007

Reply to OA dated March 5, 2007

the gene and a terminator ~~acting on the structural~~ serving to terminate transcription of the gene,  
~~which are externally introduced;~~

wherein the ~~structural~~ gene comprises a sequence obtained by modifying SEQ ID NO: 1, such that the modified sequence hybridizes to DNA of SEQ ID NO: 1 under conditions of 50% formamide, 10 × SSC, 5 × Denhardt solution, 1%SDS, 10% dextran sulfate, 10 µg/ml denatured salmon sperm DNA and 50 mM phosphoric acid buffer (pH 7.5) at 42°C, followed by washing with 0.1 × SSC and 0.1%SDS at 68°C, and the modified sequence encodes a protein having transglutaminase activity;

wherein the terminator is a terminator of transglutaminase isolated from *Streptomyces mobaraensis*.

Claim 26 (Previously Presented): A transformant of *Streptomyces mobaraensis* comprising a ~~structural~~ gene ~~[[of]]~~ encoding transglutaminase and a promoter promoting on the transcription of the gene and a terminator ~~acting on the structural~~ serving to terminate transcription of the gene, which are externally introduced,

wherein the ~~structural~~ gene ~~of transglutaminase~~ and the promoter and the terminator ~~acting on the structural~~ gene comprise a sequence obtained by modifying SEQ ID NO: 2, such that the modified sequence hybridizes to DNA of SEQ ID NO: 2 under conditions of 50% formamide, 10 × SSC, 5 × Denhardt solution, 1%SDS, 10% dextran sulfate, 10 µg/ml denatured salmon sperm DNA and 50 mM phosphoric acid buffer (pH 7.5) at 42°C, followed by washing with 0.1 × SSC and

U.S. Patent Application Serial No. 10/527,090  
Response filed July 30, 2007  
Reply to OA dated March 5, 2007

0.1% SDS at 68°C, and the modified sequence encodes a protein having transglutaminase activity;  
wherein the terminator is a terminator of transglutaminase isolated from *Streptomyces mobaraensis*.

Claim 27 (Previously Presented): The transformant of *Streptomyces mobaraensis* according to claim 1, which is a transformant of a strain obtained by mutating *Streptomyces mobaraensis* S-8112.

Claim 28 (Currently Amended): A process for producing transglutaminase, comprising the steps of:

culturing a transformant of *Streptomyces mobaraensis* comprising a ~~structural~~ gene ~~[[of]]~~ encoding transglutaminase and a promoter promoting on the transcription of the gene and a terminator ~~acting on the structural~~ serving to terminate transcription of the gene, ~~which are externally introduced~~; under the conditions where the ~~structural~~ gene can be expressed; and

collecting the produced transglutaminase;

wherein the ~~structural~~ gene comprises a sequence obtained by modifying SEQ ID NO: 1, such that the modified sequence hybridizes to DNA of SEQ ID NO: 1 under conditions of 50% formamide, 10 × SSC, 5 × Denhardt solution, 1% SDS, 10% dextran sulfate, 10 µg/ml denatured salmon sperm DNA and 50 mM phosphoric acid buffer (pH 7.5) at 42°C, followed by washing with



U.S. Patent Application Serial No. 10/527,090

Response filed July 30, 2007

Reply to OA dated March 5, 2007

0.1 × SSC and 0.1% SDS at 68°C, and the modified sequence encodes a protein having transglutaminase activity;

wherein the terminator is a terminator of transglutaminase isolated from *Streptomyces mobaraensis*.

Claim 29 (Currently Amended): A process for producing transglutaminase, comprising the steps of:

culturing a transformant of *Streptomyces mobaraensis* comprising a ~~structural~~ gene ~~[[of]]~~ encoding transglutaminase and a promoter promoting on the transcription of the gene and a terminator ~~acting on the structural~~ serving to terminate transcription of the gene, ~~which are externally introduced~~; under the conditions where the ~~structural~~ gene can be expressed; and

collecting the produced transglutaminase;

wherein the ~~structural~~ gene ~~of transglutaminase~~ and the promoter and the terminator ~~acting on the structural~~ gene comprise a sequence obtained by modifying SEQ ID NO: 2, such that the modified sequence hybridizes to DNA of SEQ ID NO: 2 under conditions of 50% formamide, 10 × SSC, 5 × Denhardt solution, 1% SDS, 10% dextran sulfate, 10 µg/ml denatured salmon sperm DNA and 50 mM phosphoric acid buffer (pH 7.5) at 42°C, followed by washing with 0.1 × SSC and 0.1% SDS at 68°C, and the modified sequence encodes a protein having transglutaminase activity;

wherein the terminator is a terminator of transglutaminase isolated from *Streptomyces mobaraensis*.

U.S. Patent Application Serial No. 10/527,090  
Response filed July 30, 2007  
Reply to OA dated March 5, 2007

Claim 30 (Previously Presented): The process for producing transglutaminase according to claim 7, wherein the transformant of *Streptomyces mobaraensis* is a transformant of a strain obtained by mutating *Streptomyces mobaraensis* S-8112.

Claim 31 (Currently Amended): A transformant of *Streptomyces lividans* comprising a ~~structural~~ gene ~~[[of]]~~ encoding transglutaminase and a promoter promoting on the transcription of the gene and a terminator ~~acting on the structural~~ serving to terminate transcription of the gene, ~~which are externally introduced;~~

wherein the ~~structural~~ gene comprises a sequence obtained by modifying SEQ ID NO: 1, such that the modified sequence hybridizes to DNA of SEQ ID NO: 1 under conditions of 50% formamide, 10 × SSC, 5 × Denhardt solution, 1% SDS, 10% dextran sulfate, 10 µg/ml denatured salmon sperm DNA and 50 mM phosphoric acid buffer (pH 7.5) at 42°C, followed by washing with 0.1 × SSC and 0.1% SDS at 68°C, and the modified sequence encodes a protein having transglutaminase activity;

wherein the terminator is a terminator of transglutaminase isolated from *Streptomyces mobaraensis*.

Claim 32 (Currently Amended): A transformant of *Streptomyces lividans* comprising a ~~structural~~ gene ~~[[of]]~~ encoding transglutaminase and a promoter promoting on the transcription of

U.S. Patent Application Serial No. 10/527,090  
Response filed July 30, 2007  
Reply to OA dated March 5, 2007

the gene and a terminator ~~acting on the structural~~ serving to terminate transcription of the gene,  
~~which are externally introduced;~~

wherein the ~~structural gene of transglutaminase~~ and the promoter and the terminator ~~acting on the structural gene~~ comprise a sequence obtained by modifying SEQ ID NO: 2, such that the modified sequence hybridizes to DNA of SEQ ID NO: 2 under conditions of 50% formamide,  $10 \times$  SSC,  $5 \times$  Denhardt solution, 1% SDS, 10% dextran sulfate,  $10 \mu\text{g/ml}$  denatured salmon sperm DNA and 50 mM phosphoric acid buffer (pH 7.5) at  $42^\circ\text{C}$ , followed by washing with  $0.1 \times$  SSC and 0.1% SDS at  $68^\circ\text{C}$ , and the modified sequence encodes a protein having transglutaminase activity;

wherein the terminator is a terminator of transglutaminase isolated from *Streptomyces mobaraensis*.

Claim 33 (Previously Presented): The transformant of *Streptomyces lividans* according to claim 13, which is a transformant of a strain obtained by mutating *Streptomyces lividans* 3131.

Claim 34 (Currently Amended): A process for producing transglutaminase, comprising the steps of:

culturing a transformant of *Streptomyces lividans* comprising a ~~structural~~ gene ~~[[of]]~~ encoding transglutaminase and a promoter promoting on the transcription of the gene and a terminator ~~acting on the structural~~ serving to terminate transcription of the gene, ~~which are externally introduced;~~ under the conditions where the ~~structural~~ gene can be expressed; and

collecting the produced transglutaminase;

wherein the ~~structural~~ gene comprises a sequence obtained by modifying SEQ ID NO: 1, such that the modified sequence hybridizes to DNA of SEQ ID NO: 1 under conditions of 50% formamide, 10 × SSC, 5 × Denhardt solution, 1% SDS, 10% dextran sulfate, 10 µg/ml denatured salmon sperm DNA and 50 mM phosphoric acid buffer (pH 7.5) at 42°C, followed by washing with 0.1 × SSC and 0.1% SDS at 68°C, and the modified sequence encodes a protein having transglutaminase activity;

wherein the terminator is a terminator of transglutaminase isolated from *Streptomyces mobaraensis*.

Claim 35 (Currently Amended): A process for producing transglutaminase, comprising the steps of:

culturing a transformant of *Streptomyces lividans* comprising a ~~structural~~ gene ~~[[of]]~~ encoding transglutaminase and a promoter promoting on the transcription of the gene and a terminator ~~acting on the structural~~ serving to terminate transcription of the gene, ~~which are externally introduced~~, under the conditions where the ~~structural~~ gene can be expressed; and

collecting the produced transglutaminase;

wherein the ~~structural~~ gene ~~of transglutaminase~~ and the promoter and the terminator ~~acting on the structural gene~~ comprise a sequence obtained by modifying SEQ ID NO: 2, such that the modified sequence hybridizes to DNA of SEQ ID NO: 2 under conditions of 50% formamide, 10

U.S. Patent Application Serial No. **10/527,090**

Response filed July 30, 2007

Reply to OA dated March 5, 2007

× SSC, 5 × Denhardt solution, 1% SDS, 10% dextran sulfate, 10 µg/ml denatured salmon sperm DNA and 50 mM phosphoric acid buffer (pH 7.5) at 42°C, followed by washing with 0.1 × SSC and 0.1% SDS at 68°C, and the modified sequence encodes a protein having transglutaminase activity;

wherein the terminator is a terminator of transglutaminase isolated from *Streptomyces mobaraensis*.

Claim 36 (Previously Presented): The process for producing transglutaminase according to claim 19, wherein the transformant of *Streptomyces lividans* is a transformant of a strain obtained by mutating *Streptomyces lividans* 3131.